Amendment - Claims

Please cancel claims 1-18 without prejudice.

Please add the following new claims as follows:

19. (New) A method comprising:

selecting a test PAD (programmed attenuation) value for a communications system;

selecting a test CODEC type for the communication system;

calculating a sum of absolute errors between average received values multiplied by the test PAD value and nearest CODEC linear values for the CODEC type,

selecting a minimum absolute error value based upon the calculation; and

calculating a PAD estimate based on the minimum absolute error value; and

identifying a CODEC for the communication system based on the minimum absolute error value.

20. (New) The method of claims 19, wherein the communication system comprises a first modem connected to a second modem through a digital communications network.

21. (New) The method of claims 20, wherein the communication system has a repetition frame size of one or more slots.

22. (New) The method of claim 19, wherein calculation of the sum of absolute errors is repeated by selecting the test PAD value iteratively to find the minimum error.

23. (New) The method of claim 22, wherein a first test PAD fraction is selected to have a value of 1.0, and is decremented to a value of .25 for repeated calculations of summing absolute errors.

24. (New) The method of claim 19, further comprising:

storing a plurality of PAD values corresponding to different time slots in a repetition frame, and

grouping the PAD values into bins of similar values and using the average of the PAD values in the most populated bin to form the PAD estimate.

25. (New) The method of claim 19, further comprising:

storing a plurality of minimum errors corresponding to different time slots in a repetition frame for a plurality of CODEC types;

summing the minimum stored errors for each type of CODEC; and

selecting a CODEC type having a lowest summed minimum error.

26. (New) The method of claim 25, wherein the CODEC type comprises mu-law encoding.

27. (New) The method of claim 25, wherein the CODEC type comprises A-law encoding.

28. (New) The method of claim 25, wherein the CODEC is a D4 channel bank CODEC.

29. (New) The method of claim 25, further comprising detecting the CODEC by finding an error maximum at the PAD estimate in a robbed bit signaling (RBS) time slot.

30. (New) The method of claim 19, wherein the summed absolute error is determined according to the equation:

$$\text{Error}_n = \frac{\sum_{n=Ucode72}^{Ucode105} \left| \{RcdSample_n \times TestFrac - SLICED[RcdSample_n \times TestFrac]\} \right|}{TestFrac}$$

where:

$Error_n$ = *summed absolute error*

$SLICED[x]$ = G.711 value closest to x

Ucode# = PCM (pulse code modulation) symbol pursuant to V.90 specification

$RcdSample_n$ = average received value from DIL sequences corresponding to the particular Ucode#

TestFrac = constant

for mu-law or A-law CODECs or type D4 channel bank CODECs.

31. (New) The method of claim 30, further comprising adjusting the value of TestFrac to produce a minimum error.

32. (New) The method of claim 31, wherein the value of TestFrac is between 1.0 and 0.25.

33. (New) An apparatus comprising:

a first modem; and

a second modem connected to the first modem through a digital communications network, with repetition frame (RF) size of one or more slots;

the first modem to detect and measure an actual value of programmed attenuation (PAD) in a digital trunk and to detect a type of CODEC, the first modem to:

select a plurality of test values, where each said test value corresponds to a PAD value,

select one or more CODEC types,

calculate a minimum error between preprocessed received signal values and the type of CODEC linear values for a test PAD value,

calculate a PAD estimate based on the minimum error, and

identify a CODEC type based on the minimum error.

34. (New) The apparatus of claim 33, wherein the first modem is to iteratively select PAD test values until an optimum minimum error is found.

35. (New) The apparatus of claim 33, wherein the first modem is to store a plurality of PAD values corresponding to different time slots in a repetition frame, and group the plurality of PAD values into bins of similar values and use the average of the PAD values in the most populated bin to form the PAD estimate.

36. (New) The apparatus of claim 33, further comprising wherein the first modem is to store a plurality of minimum errors corresponding to different time slots in a repetition frame for a plurality of CODEC types, sum the minimum stored errors for each type of CODEC, and select a CODEC type having a lowest summed minimum error.

37. (New) The apparatus of claim 36, wherein the CODEC is of type standard compliant mu-law or A-law encoding.

38. (New) The apparatus of claim 36, wherein the CODEC is a D4 channel bank CODEC.

39. (New) The apparatus of claim 36, wherein first modem is to detect a CODEC by finding an error maximum at the PAD estimate in a robbed bit signaling (RBS) time slot.

40. (New) The apparatus of claim 33, wherein the first modem determines a summed absolute error according to the equation:

$$\text{Error}_n = \frac{\sum_{n=Ucode72}^{Ucode105} \left| \{RcdSample_n \times TestFrac - SLICED[RcdSample_n \times TestFrac]\} \right|}{TestFrac}$$

where:

$Error_n$ = *summed absolute error*

$SLICED[x]$ = G.711 value closest to x

Ucode# = PCM symbol pursuant to V.90 specification

$RcdSample_n$ = average received value from DIL sequences corresponding to the particular Ucode#

TestFrac = constant

for mu-law or A-law CODECs or type D4 channel bank CODEC.

41. (New) The apparatus of claim 40, wherein the first modem is to adjust the value of TestFrac to produce a minimum error.

42. (New) The apparatus of claim 41, wherein the value of TestFrac is between 1.0 and 0.25.

43. (New) The apparatus of claim 33, wherein the apparatus is to preprocessing a received signal to reduce signal impairment.

44. (New) The apparatus of claim 43, wherein preprocessing comprises one or more of minimizing correlative analog impairments; averaging signal noise; and compensating for harmonic distortion.